

## POTTING MIX

A potting medium is a mixture of various raw materials designed to be used in horticulture as a substrate to support the roots of plants cultivated in pots and containers.

A good potting mix should offer the plant a substratum for both stability, a high water capacity, good nutrients supply and a sufficient air space for ample root respiration allowing water and nutrient uptake. The balance of these needs will vary, however, depending on the plant being grown and the stage of growth. When a mix is too wet most of the air is drove out. If it is too dense, without air, roots suffocate and lead to rot, otherwise a soil that is too porous, will dry out too rapidly and the plant either has to be watered daily or suffer the consequences of desiccation.

Potting mixes resolve problem combining different ingredients with opposite qualities, some that holds water and other that keeps the mix open and light. Materials often used in potting mixes are:

Characteristics of material										
Material	Promotes drainage	Holds water	Adds weight	Adds nutrients	Mostly organic	Mostly inert	Acid	Neutral	Alkaline	Sterile
Pine bark mulch	XXX	X	0	X	XXX	0	XX	0	0	0
Peat	0	XXX	0	X	XXX	0	XXX	0	0	0
Sand	XX	0	XXX	0	0	XXX	0	X	0	X
Vermiculite	0	XXX	0	X	0	XX	0	X	0	XX
Perlite	XXX	0	0	0	0	XXX	0	X	0	XXX
Polymers	0	XXX	0	0	0	XXX	0	X	0	XXX
Fertilizers	0	0	0	XXX	0	0	XXX	0	0	XXX
Ground limestone	0	0	X	XX	0	0	0	0	XXX	XXX
Compost	0	XXX	X	XX	XXX	0	X	X	X	0

XXX = very good in this characteristic  
 XX = Okay in this characteristic  
 X = Weak in this characteristic  
 0 = not applicable

### Composted pine bark

Composted pine bark has a high lignin content, making it slow to degrade. Bark lightens the mix, increases air space, and decreases water-holding capacity. It may be substituted, in part, for peat moss. Composted pine bark appears to impart some disease resistance. Its pH is generally 5.0 to 6.5, and it is low in soluble salts. Mixes using composted pine bark will probably require more nitrogen supplementation.

### Sphagnum peat moss and other forms of peat

Sphagnum peat moss is the most commonly used soil-less medium, because it is widely available and relatively inexpensive. Peat moss is a very stable organic material that holds a great deal of water and air and does not decompose quickly. Peat moss is quite acidic (pH 3.5 to 4.0); limestone is commonly added to the mix to balance the pH. Younger, lighter-colored peat moss does a better job of providing air space than older, darker peat that has few large pores.

### Coco Peat/Coir

Coco peat is the 'coir fibre pith' or 'coir dust' produced as a bi-product when coconut husks are processed for the extraction of the long fibres from the husk. Produced from entirely renewable organic resources, coco peat products feature increased water use efficiency, superior air capacity, and work well with both organic and inorganic plant nutrients.

Coco peat is a multi-purpose soil conditioner and container gardening growing medium. It looks like sphagnum peat but is more granular and does not contain twigs or sticks. It is consistent and uniform in texture and is now available in fine and coarser, more fibrous consistencies. It is a completely homogenous material composed of millions of capillary micro-sponges that absorb and hold up to eight times their own weight in water. Coir is typically shipped in compressed bricks, which expand when wetted. It is easier to wet than peat because there is no waxy cutin to repel water. Coir lasts two to four times longer than peat. The natural pH is generally between 5.5 and 6.5 combined with a 30-70% air to water ratio that assures coir will hold and release nutrients in solution over extended periods with reduced watering. It usually contains higher levels of potassium, sodium, and chlorine than peat.

### **Sand**

Sand in a growing mix can make a difference. Coarse sand is best. It adds air spaces to the potting mix. Clean, washed sand has a near-neutral pH and little if any food value for plants. Sand is much heavier than any other ingredient used in potting mixes. The added weight is good for tall, top-heavy plants that might blow or tip over, but it is not the best choice for plants that will be shipped or moved a lot. Sand is the least expensive and most readily available larger-particle material.

### **Vermiculite**

Vermiculite is a micaceous mineral that is expanded in a furnace, forming a lightweight aggregate. Handled gently, vermiculite provides plenty of air space in a mix. Handled roughly, vermiculite compacts and loses its ability to hold air. Vermiculite holds water and fertilizer in the potting mix. It also contains calcium and magnesium and has a near-neutral pH. Vermiculite comes in different grades. Medium grade is usually used for starting seeds. A coarse grade can be used in soil mix for older plants.

### **Perlite**

Perlite is a volcanic rock that is heated and expanded to become a lightweight white material. It is sterile and pH-neutral. When added to a soil mix, perlite can increase air space and improve water drainage. It is a hard material that does not break apart easily. Perlite pieces create tiny air tunnels that allow water and air to flow freely to the roots. Perlite will hold from three to four times its weight in water, yet will not become soggy. It is much lighter than—and can be used instead of—sand.

### **Alternative Fertilizers**

Various organic fertilizers are often used in media. This is especially important in blends that contain little or no compost or soil, since the nutrient content of most other substrates is usually quite low. The base ingredients of the growing media may also influence the choice of fertilizers to be added. Fertilizers that are slowly available may be a poor choice in blends that lack the active microbial complex found in good compost or rich garden soil. Also, many organic fertilizers have a significant effect on pH, and adjustments may need to be made in that regard.

Some organic fertilizers used are alfalfa meal, blood meal, bone meal, fish meal, bat guano, seabird guano, kelp meal, dried manure, rock phosphate, wood ash and worm castings.

### **Limestone**

Calcium carbonate ( $\text{CaCO}_3$ ) and calcium magnesium carbonate (called dolomitic limestone) are natural forms of lime that are used to adjust pH and provide nutrients. Many other lime products—burned ( $\text{CaO}$ ) and slaked limes ( $\text{CaOH}$ )—are prohibited. Lime should be well ground for use in growing media.

### **Compost**

Compost is a key ingredient in most organic potting mixes, providing an organic source of nutrients, reducing reliance on the finite global supplies of peat, and supporting recycling of organic residues. In addition to using compost that meets organic standards, it is essential to use high quality compost that will result in good plant performance. Since compost can vary from batch to batch, there can also be variation in organic potting mix performance, even when it's made using the same recipe.

Compost is rarely used by itself as a potting medium. Compost alone does not have the optimal water holding characteristics, and soluble salt levels are often higher than optimal for potting mix. Organic potting mixes are typically made with 20% to 50% compost by volume, depending on the type of crop that will be grown in the mix, the container size, and the growing conditions.

Nitrogen availability is usually the biggest challenge to organic potting mix formulation, as it can be quite variable, and N is often insufficient when compost is the sole nutrient source. Most organic potting mixes are supplemented with organic N sources such as alfalfa meal, blood meal, crab meal, etc. to assure vigorous seedling growth for several weeks or more. Some growers water with fish emulsion or other soluble organic N fertilizers to keep their transplants 'growing on' if a mix has run out of available nitrogen.

In many circumstances, compost can suppress plant disease. During the last phase of composting the humus content increases and some beneficial organisms—like *Streptomyces*, *Gliocladium*, and *Trichoderma*, which serve as biocontrol agents—re-colonize the compost.